Weather and Climate

Gates of the Arctic Spring 2014 Weather Summary

Bettles Spring Weather 2014

In Bettles, March temperatures were warmer than normal, and snowfall was quite a bit below normal. The average temperature of 8.7° F for March was 4.3° F warmer than normal. The warmest temperature of the month (39° F on March 14), broke the old daily record of 36° F set in 1981. Only 2.3 inches of snow fell in March, compared to a normal of 9.3 inches.

April temperatures were near normal despite a brief cold snap April 8-11. A record high temperature of 47° F was recorded on April 15. The total precipitation for the month was 0.38 inches, 63% of normal. Half of the monthly precipitation came during one rain event on April 29.

Overall, May was slightly cooler than normal and precipitation was near normal. Despite only 7.4 inches of total snowfall since February, total snowfall for the year was 92.9 inches, 1.5 inches more than normal. The snowy months of November and January made this possible. Melt-out at the airport occurred on May 4, about one week earlier than normal. The transition to summer was wet. 0.77 inches of rain fell from May 31-June 1.

The average spring temperature at Bettles was 25.4° F which is 2.4° F warmer than the 1981-2010 normal and 2.8° F warmer than the long-term average (1952-2014) (Figure 6). Total precipitation for the spring was 1.35 inches, only 65% of normal. (see Figures 1 and 2; Table 1, 2, and 3)

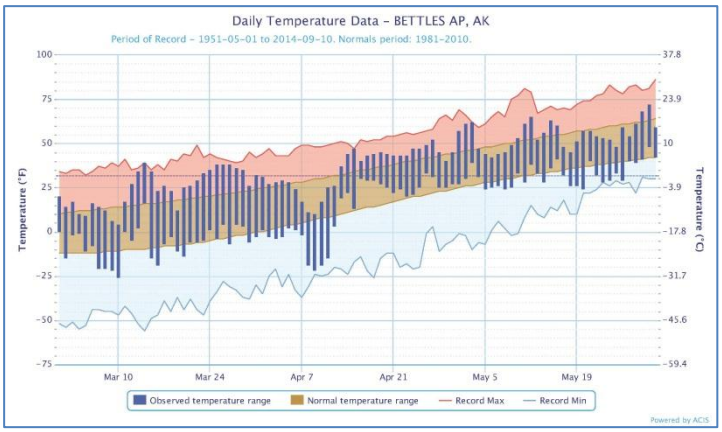

Figure 1. Spring 2014 daily temperatures at Bettles showing record maximum (red), record minimum (blue), normal (brown) and **2014 observed** range (blue bars).

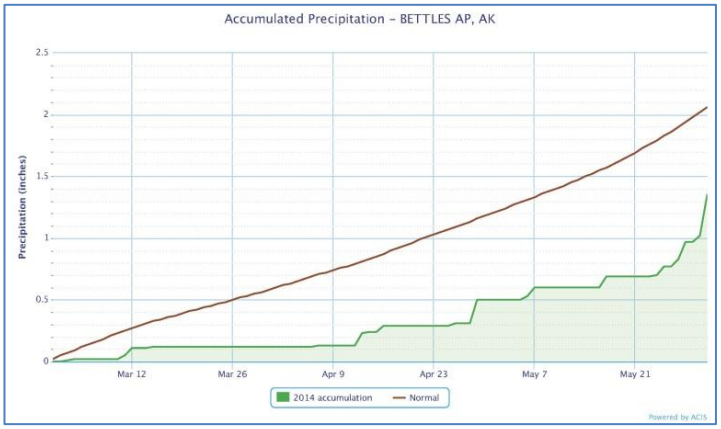

Figure 2. Spring **2014** accumulated precipitation at Bettles (green) compared to **normal** (brown line).

Table 1. Temperature: Spring 2014 average monthly temperatures compared to the 1981-2010 normal.

Spring 2014	Average Monthly Temp °F	1981-2010 Normal °F	Departure from Normal °F	Monthly High °F / Date	Monthly Low °F / Date
March	8.7	4.4	+4.3	39 / Mar 14	-26 / Mar 10
April	24.0	23.3	+0.7	52 / Apr 27	-22 / Apr 9
May	43.5	44.4	-0.9	72 / May 30	24 / May 5, 8, 20

Spring Season Temperature Departure from Normal: +1.4°F

Table 2. Precipitation: Spring 2014 monthly precipitation totals compared to normal.

Spring 2014	Total Monthly Precip. in.	1981-2010 Normal in.	Departure from Normal in.	Greatest 24 -hr. total in. / Date	# Days with >=0.01 in. water
March	0.12	0.58	-0.46	0.06 / Mar 12	5
April	0.38	0.60	-0.22	0.19 / Apr 29	6
May	0.85	0.88	-0.03	0.33 / May 31	9

Spring Season Departure from Normal: -0.71 inches (66% of normal)

Table 3. Snowfall: Spring 2014 monthly snowfall totals compared to normal.

Spring 2014	Total Monthly Snowfall in.	1981-2010 Normal in.	Departure from Normal in.	Greatest 24 -hr. snowfall total in. / Date	Cumulative snowfall since 1-July in.	Snow Depth at end of month
March	2.3	9.3	-7.0	1.3 / Mar 12	92.6	28
April	0.1	6.3	-6.2	0.1 / Apr 7	92.7	8
May	0.2	1.3	-1.1	0.2 / May 7	92.9	0

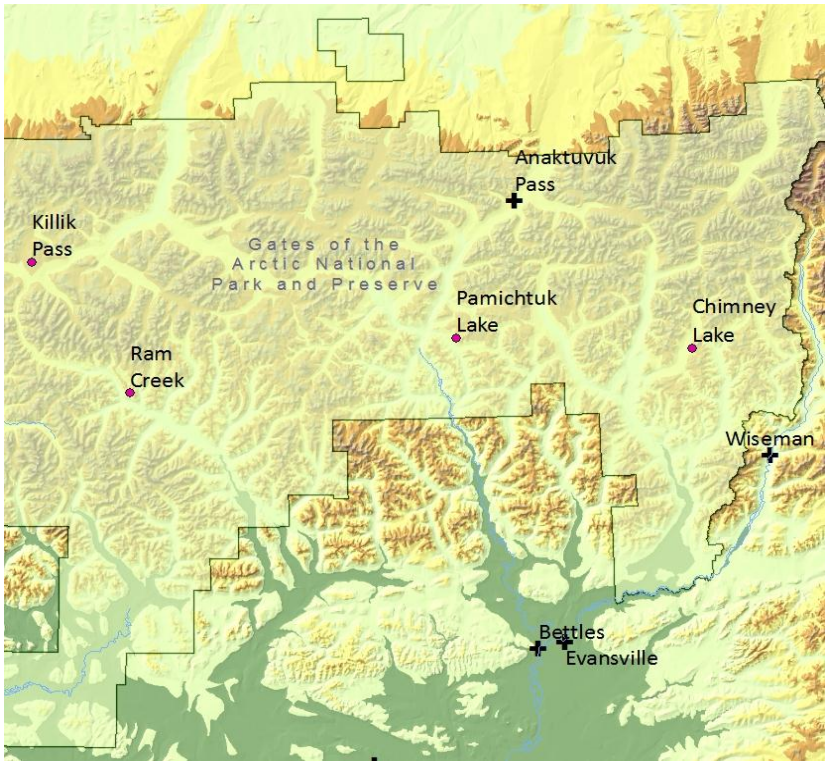

Figure 3. NPS Climate stations in Gates of the Arctic National Park and Preserve.

Table 4. Summary of weather statistics from the Gates of the Arctic climate stations. All data are preliminary and subject to review.
*NPS stations installed in 2012.

Site	Elev. Ft.	Average Temp ° F Mar	Apr	May	Spring 2014 Avg. Temp °F	Extremes ° F High	Low	Peak Wind mph	High T-Low T °F
Umiat	267	-9.6	7.9	33.1	10.5	52	-37	36	89
Wiseman	1180	8.2	23.6	42.0	24.6	68	-38	--	108
Atigun Pass	4800	6.2	11.9	26.5	14.9	48	-31	--	79
Anaktuvuk Pass	2103	0.0	12.9	32.2	15.0	61	-36	26	97
Norutak Lake	800	8.5	26.1	42.6	25.7	65	-33	31	98
***Chimney Lake**	3700	13.0	18.5	32.3	21.3	49	-13	39	62
***Pamichtuk Lake**	3135	11.6	17.9	34.4	21.3	52	-18	42	70
***Killik Pass**	4355	8.6	15.6	28.1	17.4	46	-23	34	69
***Ram Creek**	4100	M	18.1	31.4	M	56	M	M	M

Interesting notes from RAWS stations:

- The average monthly temperature at Killik Pass last April was 3.6° F; this year it was 15.6°F.

- At the Pamichtuk site the peak wind gust exceeded 25 mph on 6 days in March, 4 days in April, and 10 days in May.

- On average, the Killik Pass station was 18.2°F warmer than Umiat in March, and 5.0°F cooler in May.

- Wiseman showed the largest temperature range for the spring. It was -38°F on March 10 and +68°F on May 30.

Figure 4. Annual maintenance at the Ram Creek climate station.

Climate Monitoring in Gates of the Arctic National Park and Preserve

We now have additional NPS climate stations in Gates of the Arctic that complement the long-term record available from the National Weather Service station in Bettles. The new NPS stations will provide critical data along a high elevation east west transect across the Central Brooks Range that will help characterize the climate gradients and patterns affecting resources in Gates of the Arctic National Preserve. Table 4 summarizes the spring weather data for the new sites* and other long-term stations near the park.

We have added phenology cameras to some of the climate stations (Fig. 4). These cameras capture images four times per day; the images are downloaded once a year. The images are used to help quantify the snow season, green-up period, and other basic phenologic information.

Figure 5. Time lapse camera at the Pamichtuk climate station.

Bettles Spring Temperature Trend

The average spring temperature for 2014 was 25.4° F, which is 2.4° F warmer than the 1981-2010 normal (the latest climate normal period) and 2.8° F degrees warmer than the long-term average (1952-2014).

We calculate the average spring temperature by simply taking the average of March, April, and May monthly temperatures. Average spring temperatures show great variability with a range between 12.4°F in 1964 and 31.5° F in 1998.

There has been a statistically significant ($p<0.05$) increase in average spring temperatures over the period of record based on a linear regression. The 10-year moving average shows the warmest period in the late 1990s. The spring period over the past ten years has been near the long-term average. (Figure 6)

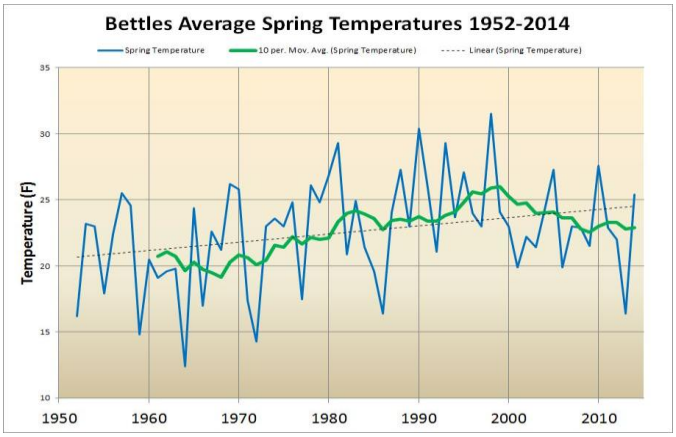

Figure 6. Average spring temperatures (March, April, May) at Bettles since 1952. The green line is a 10-year moving average. The dashed line is a simple linear regression.

Connecting Further

- New paper published – Recent Sea Ice Increase and Temperature Decrease in the Bering Sea area, Alaska
- Previous weather summaries and other climate monitoring documents on the Arctic Network web portal
- Access near real-time data from Western Regional Climate Center and MesoWest
- Statewide summary of weather highlights in the latest Alaska Climate Dispatch from the Alaska Center for Climate Assessment and Policy
- Map of projected temperature and precipitation changes for Gates of the Arctic National Park and Preserve.

More Information

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